

## **SECTION 02240**

### **DEWATERING**

#### **PART 1 - GENERAL**

##### **0.1 DESCRIPTION OF WORK**

- A.** Work Included: This Section specifies dewatering to facilitate subsurface construction.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
  - 1. Section 02260 - EXCAVATION SUPPORT AND PROTECTION.
  - 2. Section 02300 - EARTHWORK: excavating, backfilling, site grading and for site utilities.

##### **0.2 PERFORMANCE REQUIREMENTS**

- A.** Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control groundwater flow into excavations and permit construction to proceed on dry, stable sub-grades.
  - 1. Maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to sub-grades and permanent structures is prevented.
  - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
  - 3. Accomplish dewatering without damaging existing buildings adjacent to excavation.
  - 4. Remove dewatering system if no longer needed.
  - 5. Provide for legal and suitable disposal of groundwater.
  - 6. Evaluate existing soil conditions and propose equipment and techniques to dewater both non-cohesive and cohesive soils.

##### **0.3 SUBMITTALS**

- A.** Shop Drawings for Information: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of headers and discharge lines; and means of discharge and disposal of water.
  - 1. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.

2. Include a written report outlining control procedures to be adopted if dewatering problems arise.
  3. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.
- B.** Qualification Data: For Installer and professional engineer.
- C.** Photographs or videotape, sufficiently detailed, of existing conditions of adjacent structures and site work that might be misconstrued as damage caused by dewatering operations.
- D.** Record drawings at Project closeout identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions performed during dewatering.
1. Note locations and capping depth of wells and well points.
- E.** Field Test Reports: Before starting excavation, submit test results and computations demonstrating that dewatering system is capable of meeting performance requirements.
- F.** Adjacent Foundations Report and Analysis: Record subsurface foundation systems of adjacent structures and evaluate impacts of groundwater removal; i.e. wood foundations and similar items.
- G.** The Contractor shall dewater for the length of time necessary to complete the specified sub-surface improvements. Dewatering operations shall be stopped based on a mutual decision between the Contractor and the engineering consultant. Any requirements to remove portions of the dewatering system will be noted on the Drawings.

#### **0.4 QUALITY ASSURANCE**

- A.** Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.
- B.** Professional Engineer: Engage a professional engineer to design and certify dewatering systems. Engineer shall have a minimum of 5 years experience with type of dewatering systems similar to those proposed for use.

#### **0.5 PROJECT CONDITIONS**

- A.** Existing Utilities: Do not interrupt utilities serving facilities occupied by Authority or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.

- B.** Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Authority will not be responsible for interpretations or conclusions drawn from this data.
1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
  2. The geotechnical report is available from the Authority.
- C.** Survey adjacent structures and improvements, employing a qualified professional engineer or land surveyor, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent structures.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **0.1 PREPARATION**

- A.** Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.
1. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on prepared sub-grades, and from flooding site and surrounding area.
  2. Protect sub-grades and foundation soils from softening and damage by rain or water accumulation.
- B.** Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Authority and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

## **0.2 INSTALLATION**

- A.** Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
- B.** Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed, or until dewatering is no longer required.
- C.** Provide an adequate system to lower and control groundwater to permit excavation, construction of structures, and placement of fill materials on dry sub-grades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
  - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, sub-grade softening, and slope instability.
- D.** Reduce hydrostatic head in water-bearing strata below sub-grade elevations of foundations, drains, sewers, and other excavations.
  - 1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.
- E.** Dispose of water removed by dewatering in a manner that avoids negative impacts on abutters, endangering public health, property, and portions of work under construction or completed. Dispose of water in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.
- F.** Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Authority.
  - 1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.
- G.** Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

### **0.3 OBSERVATION WELLS**

- A.** Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated and additional observation wells as may be required by authorities having jurisdiction.
- B.** Observe and record daily elevation of ground water and piezometric water levels in observation wells.
- C.** Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. Suspend construction activities in areas where observation wells are not functioning properly until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
  - 1. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.

## **PART 4 - MEASUREMENT AND PAYMENT**

### **0.1 MEASUREMENT**

- A.** No separate measurement will be made for dewatering, but all costs in connection therewith shall be included in the lump sum price for dewatering except as otherwise noted. All preparation and incidental work necessary to accomplish the installation will be considered incidental to the Lump Sum price. All costs to install the dewatering system, dewater the specified locations and remove dewatering equipment shall be included in the lump sum cost.

### **0.2 PAYMENT**

- A.** Payment for dewatering will be made at the Contract lump sum prices as specified above.

### **0.3 PAYMENT ITEMS**

ITEM NO.	DESCRIPTION	UNIT
0223.000	DEWATERING	LS

**END OF SECTION**

## **NOTES TO THE DESIGNER**

- A.** Any request to modify or waive the specification requirements listed below must be approved in writing by the MBTA's Director of Design:
1. Where applicable, the A/E consultant shall contact the Boston Preservation Trust (BPT) prior to finalizing the dewatering design plans. Pertinent BPT comments concerning dewatering operations shall be included in the Contract Documents.